



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/735,122	12/12/2003	Grant Kloster	42P16019	1922
59796	7590	01/15/2008		
INTEL CORPORATION c/o INTELLEVATE, LLC P.O. BOX 52050 MINNEAPOLIS, MN 55402			EXAMINER TSOY, ELENA	
			ART UNIT 1792	PAPER NUMBER
			MAIL DATE 01/15/2008	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/735,122

Applicant(s)

KLOSTER ET AL.

Examiner

Elena Tsoy

Art Unit

1792

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 29 November 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,12-17,25 and 27-31 is/are pending in the application.
- 4a) Of the above claim(s) 6 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,12-17,25 and 27-31 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

***Response to Amendment***

Amendment filed on November 29, 2007 has been entered. Claims 6-9, and 26 have been cancelled. Claims 1, 12-17, 25, 27-31 are pending in the application.

***Claim Objections***

1. Objection to claims 13, 14, 28, and 29 because of the informalities has been withdrawn due to amendment.
2. Claim 1 is objected to because of the following informalities: Claim 1 is not rewritten to include all limitations of claim 9 and all intervening claims as requested by the Examiner. For example, claim 9 does not recite phosphogene; and it recites limitations of the intervening claim 7 *incorrectly*. Claim 7 requires a step of exposing the coupling structures to a sealing agent after the step of exposing the porous dielectric material to a coupling agent.

***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claim 1 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 1 recites "phosphogene" which was not described in the specification. Note that the Applicants' specification and original claim 9 recite "phosgene".

Art Unit: 1792

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 27-30 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 27-30 depend on canceled claim 26 thereby rendering the claims indefinite. For examining purposes the claims were interpreted as depending on claim 25.

The Examiner Note for examining purposes a phrase "a substantially long chain of CH<sub>2</sub> molecules" in claims 13 and 28 was interpreted as chain of at least 4 CH<sub>2</sub> groups.

### ***Claim Rejections - 35 USC § 102***

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Rejection of claims 1, 7-8 under 35 U.S.C. 102(e) as being anticipated by Ivanov et al (US 6881437) has been withdrawn due to amendment.
9. Rejection of claim 1 under 35 U.S.C. 102(e) as being anticipated by Kajiura et al (US 5907382) has been withdrawn due to amendment.

Art Unit: 1792

10. Rejection of claims 1 and 7-8 under 35 U.S.C. 102(e) as being anticipated by Sawyer (US 4167045) has been withdrawn due to amendment.

***Claim Rejections - 35 USC § 103***

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Rejection of claims 1, and 7-8 under 35 U.S.C. 103(a) as being unpatentable over Kurumatani et al (US 5632776) in view of Sawyer has been withdrawn due to amendment.

13. Rejection of claim 25 under 35 U.S.C. 103(a) as being unpatentable over Fleckenstein et al (US 4902290) in view of Sawyer has been withdrawn due to amendment.

14. Claims 12-16 and 25, 27-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ivanov et al/Kajiura et al/ in view of Nie et al (US 20030148544), further in view of Fleckenstein et al.

Ivanov et al/Kajiura et al/ are applied here for the same reasons as set forth in paragraphs 3-4 of the Office Action mailed on 6/21/2007. Ivanov et al/Kajiura et al/ fail to teach that the silane coupling agent has a thiol end so that a barrier molecule comprises a silicon atom coupled to a surface of the pore, a sulfur atom, and a flexible chain between the silicon atom and the sulfur atom (Claim 12); the flexible chain comprises a substantially long chain of CH<sub>2</sub> molecules (Claim 20) such as 4 chains (Claim 21).

Art Unit: 1792

Nie et al teach that silane compounds such as mercaptopropyl-trimethoxysilane and aminopropyltrimethoxysilane can be used for sealing pores (See P54, the second method) in glass (silica) (See P37).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used mercaptopropyl-trimethoxysilane as a silane coupling agent in Ivanov et al/Kajiura et al/with the expectation of providing the desired pore sealing since Nie et al teach that silane compounds such as mercaptopropyl-trimethoxysilane and aminopropyltrimethoxysilane are suitable for sealing pores in glass (silica).

It is held that the selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). See MPEP 2144.07.

The Examiner takes official notice that mercaptopropyl-trimethoxysilane would be **strongly bonded** to SiO<sub>2</sub> (silica) surface of Ivanov et al or **coupled** to SiO<sub>2</sub> (silica) surface of Kajiura et al/ by reacting methoxy groups with SiOH groups on the silica surface since it is a common knowledge in the art that alkoxy containing silane bonds or couples to the silica surface having SiOH groups by reacting alkoxy group with SiOH group forming Si-O-Si bond.

Ivanov et al/Kajiura et al/ in view of Nie et al fail to teach introducing an oxidizing agent to facilitate formation of disulfide bonds between adjacent oxidized thiol end cap.

However, it is well known in pore sealing art to attach thiol group-containing compounds to pores, then subject the attached thiol group-containing compounds to oxidative crosslinking, accompanied by the formation of disulphide bridges, as evidenced by Fleckenstein et al (See column 1, lines 42-47).

Art Unit: 1792

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have subjected thiol group-containing compounds attached to pores in the cited prior art to known oxidative crosslinking with the expectation of providing the desired sealing pores.

As to claim 14, it should be noted that mercaptopropyl-trimethoxysilane is a homologue of claimed silane because it differs only in one methylene group. Homologues are a class of compounds differing only by methylene linkages and possessing similar properties. Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a homologue of mercaptopropyl-trimethoxysilane, e.g. mercaptobutyl-trimethoxysilane in the cited prior art in view of their closely related structures and the resulting expectation of similar properties.

15. Claims 17 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ivanov et al/Kajiura et al/ in view of Nie et al (US 20030148544), further in view of Fleckenstein et al, and further in view of Cottle et al (US 2,874,192).

The cited prior art fails to teach that the oxidizing agent comprises formaldehyde.

However, it is well known in the art that disulfides such as mercaptals can be formed by reacting mercaptans with aldehyde, as evidenced by Cottle et al (See column 1, lines 3-8).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used aldehyde including formaldehyde as oxidizing agent in the cited prior art with the expectation of providing the desired oxidative crosslinking by forming disulfides since it is well known in the art that disulfides can be formed by reacting mercaptans with aldehyde, as evidenced by Cottle et al.

Art Unit: 1792

***Response to Arguments***

16. Applicant's arguments filed November 29, 2007 have been fully considered but they are not persuasive.

**Ivanov in view of Kaiiura, Nie and Fleckenstein -Claims 12-16, 25-30**

Applicants argue that the Office contends it would have been obvious to use the coupling agent in Nie with the invention of Ivanov/Kajiura and the oxidizing agent of Fleckenstein (to which the Applicants do not concede). Because neither Ivanov/Kajiura and Fleckenstein, Nie, either alone or in combination, teach or even suggest the limitations of amended claims 12 and 25, (and claims 13-16, 27-30 dependent on 12 and 25 respectively) are not rendered obvious by Ivanov/Kajiura and Fleckenstein, Nie.

The Examiner respectfully disagrees with this argument. First of all, in contrast to Applicants statement, claims 12-16, 25-30 are rejected over Ivanov/Kaiiura/ in view of Nie, further in view of Fleckenstein, i.e. Ivanov in view of Nie, further in view of Fleckenstein *or* Kaiiura in view of Nie, further in view of Fleckenstein.

Second, Ivanov/Kajiura and Fleckenstein, Nie, in combination, teach or suggest the limitations of amended claims 12 and 25, (and claims 13-16, 27-30) for the reasons discussed above.

***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period



Art Unit: 1792

will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elena Tsoy whose telephone number is 571-272-1429. The examiner can normally be reached on Monday-Thursday, 9:00AM - 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on 571-272-142323. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Elena Tsoy, Ph.D.  
Primary Examiner  
Art Unit 1792

ELENA TSOY  
PRIMARY EXAMINER  
*ETsoy*

January 9, 2008